UNITED STATES PATENT AND TRADEMARK OFFICE

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10/069,670	02/22/2002	Xavier Leroy	102114.00034	3622

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-6,8-18,20,22 and 24-27* is/are pending in the application.

  4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-18,20,22 and 24-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

  Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

  Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

  a)☒ All b)☐ Some * c)☐ None of:

    1.☒ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

  * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
  Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
  Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments with respect to claims 4-6, 8-18, 20, 22, 24-27 have been considered but

are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

3.   Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to

particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4.   In regard to claim 4, Applicant's preamble has claimed a program fragment consisting of an

object code, and including at least one subprogram consisting of a series of instructions manipulating said

operand registers. It is unclear from Applicant's language what the program fragment consists of,

whether the program also consists of the subprogram, and whether the series of instructions is part of the

program, the subprogram, or both. For purposes of compact prosecution, Applicant's claim is treated as

the subprogram consists of the instructions, and the program fragment consists of only the object code.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   Claims 4-6, 8-18, 20, 22, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Gosling (US 6,075,940) in view of Scandura (US 6,275,976).

7.   In regard to claim 4, Gosling taught a verification process for Java (OAK) code. Gosling, column

1, line 60 – column 2, line 3. Gosling initialized or cleared stacks. Gosling, column 3, line 63 – column 4,

line 4. Gosling failed to teach the verification was successful based upon the table of register types being

stable without the presence of modifications. Scandura was designed to be a verification system for

object oriented programs. Scandura, column 31, lines 40-61. Scandura was designed to be extended to

the Java language. Scandura, column 111, line 27. Scandura was designed to check for consistency of

objects present in the system being verified. Scandura, column 34, lines 19-56. Scandura and Gosling

are both analogous since both teach verification systems for software. Gosling gave suggestion for the

combination by stating that automated software verification tools are needed to verify the integrity of

software transferred. Gosling, column 1, lines 46-57. It would have been obvious to one of ordinary skill

in the art at the time of invention to combine the consistency verification of Scandura with the stack

verification of Gosling in order to create a stronger software verification system which detects errors in

code before execution but after creation and transfer of the code.

8.   In regard to claim 5, Gosling further disclosed the variable types manipulated include at least

class identifiers corresponding to object classes which are defined in the program fragment, numeric

variable types including at least a type for an integer coded on a given number of bit, designated as short

type, and a type for the return address of a jump instruction, designated as a return address type;

references of null objects designated as null type; object type relating to objects designated as object

type; a first specific type representing the intersection of all the types and corresponding to the zero

value, designated as the intersection type; and a second specific type representing the union of all the

types and corresponding to any type of value, designated as the union type. Gosling, column 3, line 50 -

column 4, line 8.

9.   In regard to claim 6, Gosling further disclosed all variable types verify a subtyping relation: object

type belongs to the union type; short type and return address type belong to the union type; and the

intersection type belongs to null type, short type or return address type. Gosling, column 3, line 50 -

column 4, line 8.

10.   In regard to claim 8, Gosling further disclosed verifying that the previous instruction to said

current instruction is an unconditional branching, a subroutine return or a withdrawal of an exception; and

reupdating the stack of variable types by an entity of the return address type, formed by the return

address of the subroutine, in case of a positive verification process; and, rejecting said program fragment

in case said verification process is failing, otherwise. Gosling, column 6, lines 48-62; column 7, line 49 –

column 8, line 65.

11.   In regard to claim 9, Gosling further disclosed verifying that the previous instruction to said

current instruction is an unconditional branching, a subroutine return or a withdrawal of an exception; and

reupdating the type stack, by entering the exception type, in case of a positive verification process; and

rejecting said program fragment in case of said verification process is failing, otherwise. Gosling, column

6, lines 48-62; column 7, line 49 – column 8, line 65.

12.   In regard to claim 10, Gosling further disclosed wherein said current instruction being the target of

multiple incompatible branchings, said verification process is failed and said program fragment is

rejected. Gosling, column 6, lines 48-62; column 7, line 49 – column 8, line 65.

13.   In regard to claim 11, Gosling further disclosed wherein said current instruction being not the

target of any branching, said verification process comprises continuing by passing to an update of the

type stack. Gosling, column 6, lines 48-62; column 7, line 49 – column 8, line 65.

14.   In regard to claim 12, Gosling further disclosed said step of the verification of the effect of the

current instruction on the type stack includes at least: verifying that the type execution stack includes at

least as many entries as the current instruction includes operands; unstacking and verifying that the types

of the entries at the top of the stack are subtypes of the types of the operands types of the operands of

said current instruction; verifying the existence of a sufficient memory space on the types stack to

proceed to stack the results of said current instruction; stacking on the stack data types which are

assigned to these results. Gosling, column 6, lines 48-62; column 7, line 49 – column 8, line 65.

15.   In regard to claim 13, Gosling further disclosed verifying the data type of the result of a

corresponding reading, by reading an entry at said given address in the table of register types;

determining the effect of said current instruction on the type stack by unstacking the entries of the stack

corresponding to the operands of said current instruction and by stacking the data type of said result.

Gosling, column 6, lines 48-62; column 7, line 49 – column 8, line 65.

16.   In regard to claim 14, Gosling further disclosed determining the effect of the current instruction on

the type stack and the given type of the operand which is written in this register at said given address;

replacing the type entry of the table of register types at said given address by the type immediately above

the previously stored type and above the given type of the operand which is written in this register at said

given address. Gosling, column 6, lines 48-62; column 7, line 49 – column 8, line 65.

17.   Claim 15 is substantially the same as claim 4.

18.   Claim 16 is substantially the same as claim 4.

19.   Claim 17 is substantially the same as claims 9-10.

20.   In regard to claim 18, Scandura further disclosed determining the lifetime intervals of each

register; determining the main data type of each lifetime interval, the main data type of a lifetime interval

for a given register being defined by the upper bound of the data types stored in said given register by the

backup instructions belonging to said lifetime interval; establishing an interference graph between the

lifetime intervals, said interference graph consisting of a non-oriented graph of which each peak consists

of a lifetime interval, and of which the arcs between two peaks exist if one of the peaks contains a backup

instruction addressed to the register of the other peak or vice versa; translating the uniqueness of a data

type which is allocated to each register in the interference graph, by adding arcs between all pairs of

peaks of the interference graph while two peaks of a pair of peaks do not have the same associated main

data type; carrying out an instantiation of the interference graph, by assigning to each lifetime interval a

register number, in such a way that different register numbers are assigned to two adjacent life time

intervals in said interference graph. Scandura, column 36, lines 30-59.

21.   Claim 20 is substantially the same as claim 4.

22.   Claim 21 is substantially the same as claim 4 and claims 9-10.

23.   Claim 24 is substantially the same as claim 4.

24.   Claim 25 is substantially the same as claim 4 and claims 9-10.

25.   Claims 26-27 are substantially the same as claim 4.

Conclusion

26.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

27.   Necula et al.   US 6,128,774

28.   Yellin et al.   US 5,999,731

29.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office

action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of

the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from

the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date

of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

shortened statutory period, then the shortened statutory period will expire on the date the advisory action

is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX

MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should

be directed to Jeffrey R. Swearingen whose telephone number is (571)272-3921. The examiner can

normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,

Jason Cardone can be reached on 571-272-3933. The fax phone number for the organization where this

application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained from

either Private PAIR or Public PAIR. Status information for unpublished applications is available through

Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

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or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-

1000.

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